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Violence and violent victimization in people with severe mental illness in a rural low-income country setting: a comparative cross-sectional community study

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ABSTRACT

BACKGROUND: Violence perpetrated by and against people with severe mental illness (SMI) is important but rarely investigated in low- and middle income countries.

OBJECTIVE: To compare the prevalence of perpetrated violence and violent victimization, and associated factors, in people with and without SMI in rural Ethiopia**.**

METHOD: A random sub-sample of people with a standardized, clinician diagnosis of SMI (n= 201) was recruited from an existing population-based study and compared to a group of unaffected individuals from the same neighborhood (n=200). The lifetime and 12-month prevalence of violence and violent victimization was measured using an adapted version of the McArthur Violence Interview.

RESULT: Lifetime and 12-month prevalence of perpetrated violence in people with SMI (28.4% and 17.4%, respectively) was significantly higher than in the non-mentally ill comparison group (15.0% and 8.5%, respectively). Male gender, being literate and violent victimization were associated independently with violence in both groups. In people with SMI, violence was associated additionally with being unmarried, exposure

to stressful life events and non-response to medication. The prevalence of violent victimization was also significantly higher in people with SMI than those without SMI (60.7% vs. 41.5%). In people with SMI, violent victimization was associated with unemployment, non-adherence to treatment and being a perpetrator of violence.

CONCLUSIONS: Our finding of high levels of violence and violent victimization in people with SMI underscores the need to improve access to mental health services in this setting, as well as the urgent need to raise awareness about victimization of people with SMI.

KEY WORDS: Violence, violent victimization, severe mental illness, schizophrenia, bipolar disorder, sub-Saharan Africa

Abbreviations

SMI	Severe mental illness
HCR-20	The Historical/Clinical/Risk Management 20-item (HCR-20) scale

1. INTRODUCTION

Violence perpetrated by people with severe mental illness (SMI: including bipolar disorder, schizophrenia and other psychotic disorders) has been the subject of research in high-income countries for decades (Elbogen and Johnson, 2009; Fazel et al., 2009a; Fazel et al., 2009b; Fazel et al., 2010; Swanson et al., 1990; Torrey, 1994; Vinokur et al., 2013). In high-income country settings, the presence of SMI is associated consistently with an increased risk of violence, although the extent to which this excess risk is explained by co-morbid substance misuse continues to be debated (Choe et al., 2008; Fazel et al., 2009a; Fazel et al., 2009b; Fazel et al., 2010; Short et al., 2013). The problem of violence carried out by people with SMI is often the focus of the public's attention in high-income countries; however, people with mental illness are more frequently the victims of violence ('violent victimization') than the general population (Hodgins et al., 2007; Maniglio, 2009; Sturup et al., 2011; Teplin et al., 2005; Walsh et al., 2003). Indeed, people with SMI are more likely to be victims of violence than to commit a violent act (Choe et al., 2008; Hiday et al., 2001; Hodgins et al., 2007; Silver et al., 2011).

Almost nothing is known about the risk of violent behavior or violent victimization associated with SMI in low- and middle-income countries (LMICs). Moreover people with SMI in LMICs are usually perceived to be dangerous by the community (Alem et al., 1999; Shibre et al., 2010), even though it is unclear whether they actually are more violent than members of the general population or more likely to be victims of violence. In the World Health Organization multi-country study of first contact patients with schizophrenia, the prevalence of self-reported assault against another person was

substantially higher in LMICs (Columbia, India and Nigeria) (31.5%) compared to the high-income countries (10.5%) (Volavka et al., 1997); however, in the absence of general population comparison groups it was not possible to determine the excess risk of violence associated with schizophrenia. The only other studies of violence and SMI in sub-Saharan Africa were located in psychiatric in-patient facilities and limited by small sample sizes (Amoo and Fatoye, 2010; Ben-Tovim and Boyce, 1988; Krüger and Rosema, 2010). In Nigeria, 13.8% of psychiatric in-patients were aggressive during their admission (Amoo and Fatoye, 2010), in South Africa 16.0% of psychiatric patients in long-stay in-patient facilities were violent against persons or property during the admission (Krüger and Rosema, 2010), and in Botswana, 29.0% of psychiatric in-patients had been violent against persons or property prior to admission (Ben-Tovim and Boyce, 1988). However, strong selection biases are apparent in help-seeking populations attending specialist mental health care facilities in LMICs, due to inaccessibility and scarcity of services (Fekadu et al., 2007), which limits the interpretation of these findings. The only study of violent victimization from sub-Saharan Africa that we are aware of was a small case series of in-patients from a hospital in Zaire (Burdon, 1999).

There are several compelling reasons why the available evidence from high-income countries, mostly from Western cultures, may not be applicable to people with SMI in LMICs. In many LMICs in sub-Saharan Africa the population is predominantly rural and the social and structural factors relevant to violence from people with SMI, such as high-crime neighborhoods, do not pertain (Hiday et al., 2001; Swanson et al., 2002). Differing legal contexts, for example, regarding possession of firearms, the limited availability of

emergency mental health care and absence of community-based outreach for people with SMI who disengage from care, and different patterns and extent of co-morbid substance misuse will also have a bearing on the association between SMI and violence in a given society. Lastly, the prevailing cultural, religious and social norms regarding violence and attitudes towards people with SMI will be expected to influence both violent behavior and violent victimization.

The objective of this study was to compare the prevalence of perpetrated violence and violent victimization, and associated factors, in people with and without SMI in a rural African community characterized by high social connectedness, widespread poverty and rudimentary mental health services.

2. METHODS

2.1 Study design

Comparative cross-sectional study.

2.2 Setting

The study was carried out in a predominantly rural area of Ethiopia, around Butajira town, which is located 135 km south of Addis Ababa, the capital city of Ethiopia. Butajira hosts a demographic surveillance site (Berhane et al., 1999) and the area has been a center for research in mental health for more than fifteen years (Alem et al., 2009; Kebede et al., 2006; Kebede et al., 2000; Kebede et al., 2003).

2.3 Sample

The sample was selected randomly from an ongoing population-based cohort of people with SMI (DSM-IV diagnoses of schizophrenia, schizoaffective disorder and bipolar I disorder). The initial cohort of 640 people with SMI was identified during a house-to-house survey of over 68,000 adults living in the Meskan and Mareko districts in Butajira, which was conducted between 1997 and 2001 and has been followed up for over ten years (Kebede et al., 2000; Kebede et al., 2003; Kebede et al., 2006).

2.3.1. Establishment of the original SMI cohort

In 1998, the Meskan and Mareko districts were estimated to have a population of 83 282 in the 15 to 49 year age group which constituted the source population for the cohort study. To establish the cohort, a two stage screening design was used. In the first stage, possible cases of SMI were identified from responses to the Composite International Diagnostic Interview (CIDI) (Robins et al., 1988) administered in the house-to-house survey and identification by trained community key informants (Shibre et al., 2002). In the second stage, a structured clinical interview (the Schedules for Clinical Assessment in Neuropsychiatry; SCAN) (WHO, 1992) was administered by Ethiopian clinicians in order to make a definitive diagnosis. The validity of the SCAN was established against clinical diagnosis (Alem et al., 2004) and a rigorous process of training and piloting to ensure reliable administration (Shibre et al., 2002).

2.3.2. Sample for current study

The data collection for the current study was carried out in March 2011 after the cohort of people with SMI had been followed up for between 12 and 15 years. The sampling frame was all people with SMI who remained under active follow-up (n=397): bipolar I disorder (n=210; 68.0%) and schizophrenia or schizoaffective disorder (n=187; 58.3%). Loss to follow-up over the 12 to 15 year period was due to death (n=94; 14.7%), refusal (n=83; 13.0%), migration (n=46; 7.2%) and vagrancy (n=14; 2.2%). A sample of 202 people with SMI was selected using systematic sampling with a random start-point. A comparison group of unaffected individuals, matched for age (+/- 3 years), sex and place of residence, was identified. The first or second house neighboring the house of the person with SMI was chosen for participation based on the matched age and the sex. Self-report of mental health status from the comparison group participants and their family members was used to ensure that they were not suffering from SMI. Although no clinical assessment was carried out, it has been demonstrated previously that community recognition of SMI is high (Alem et al., 1999).

2.4 Sample size

The sample size was calculated assuming a baseline prevalence of violence in the general population of 1.6% (Fazel et al., 2009a). In order to detect a 6.7-fold increase in the prevalence of violence in persons with SMI (to 9.9%) (Fazel et al., 2009a) with alpha=0.05 and power 80%, 187 persons were required in each group. Allowing for 8% contingency, a total of 202 participants were approached for each group.

2.5 INSTRUMENTS AND DATA COLLECTION

2.5.1 Primary outcomes

Violence perpetrated by the participant

Violence was defined as violence that resulted in physical injury; sexual assaults; assaultive acts that involved the use of a weapon; or threats made by the individual with a weapon in their hand (Elbogen and Johnson, 2009). Violence was measured using a self-report questionnaire based on the MacArthur Violence interview, used in several previous studies to assess violence by persons with SMI (Elbogen and Johnson, 2009; Steadman et al., 1993; Swanson et al., 2006). The questions were straightforward to adapt and to translate into Amharic, the official language of Ethiopia.

Violent victimization of the participant

Violent victimization was defined as an act of physical or threatened violence (as defined in the above paragraph) experienced by a person with SMI. The experience of being mocked by children was also included within our definition of violent victimization as this was considered to be a severe form of emotional violence. Detection of violence perpetrated against the participant was measured using questions adapted from the WHO multi-country study on violence against women (Garcia-Moreno et al., 2006). An Amharic version of the original instrument has been used in the Butajira setting and found to be culturally acceptable (Deyessa et al., 2009).

2.5.2 Primary independent variable

The primary independent variable was SMI as defined by standardized clinician DSM-IV diagnoses of schizophrenia, schizoaffective disorder or bipolar disorder at the baseline of the cohort study.

2.5.3 Potential confounding variables

Factors that could confound any observed observation between SMI and violence or violent victimization were defined prior to the study on the basis of a review of the literature (Witt et al., 2013):

- Socio-demographic characteristics: age, gender and marital status.
- Socioeconomic status: literacy level, employment status and monthly income (in Ethiopian Birr; $1 is approximately equal to 17 Birr).
- Sociocultural factors: level of religious commitment (low, average or high) and participation in social activities (never, sometimes or always).
- Substance use: Self-report of current use of alcohol or khat. Khat (Catha edulis) is an evergreen plant which contains cathinone, an amphetamine-like stimulant. Khat has been chewed in Ethiopia and across East Africa for centuries to alleviate fatigue, stay alert, reduce hunger and induce euphoria (Colzato L.S. et al., 2011).

2.5.4 Other explanatory factors*:*

Potential clinical and historical factors for violence were evaluated using a modified version of the HCR-20 (Historical, Clinical and Risk management) scale (Webster et al., 1997). Only those HCR-20 variables which were relevant to the study and which did not need clinician evaluation were translated into Amharic. The HCR-20 items included were as follows:

- Treatment related: Unresponsiveness to treatment (no improvement in clinical status following treatment) and non-adherence to antipsychotic medication (taking medication appropriately and not discontinuing medication).

- Stressful life events: This item referred to any life situation which the participants had experienced that led to tension or anxiety.

All of the instruments were translated into Amharic by the principal investigator and back-translated into English by a senior psychiatric resident. Agreement on the final version was reached by consensus. With the permission of the participants, collateral information was obtained from close caregivers or relatives.

2.5.4 Data collection

The data collectors were lay interviewers with extensive field experience working in the Butajira course and outcome of SMI study (Shibre et al., 2002). No formal assessment of reliability was carried out; however, the data collectors were trained in the new questionnaires for one day and then participated in supervised piloting of the questionnaires. In all interviews confidentiality was assured. Interviewers of the same

sex as the participant conducted the interview as some of the questions were culturally sensitive.

2.5.5 Data analysis

Data were entered using the Statistical Package for Social Science (SPSS version 16) (SPSS Inc, 2007) and analyzed using STATA version 10 (STATA corp., 2008). The 12 month and lifetime prevalence of any violent act or any experience of violent victimization was calculated separately for people with SMI and the general population comparison group. Univariate analyses of the characteristics of respondents, and the specific types of violence and violent victimization in people with and without SMI were carried out using McNemer's chi-squared exact test. Hypothesis-driven multiple logistic regression analyses were used to assess the association between the primary independent variable (SMI) and the primary dependent variables of violence and violent victimization, adjusting for all variables identified a priori as potential confounders. .

Exploratory analyses of factors associated with lifetime violence and violent victimization in the separate samples of people with SMI and the general population comparison group were carried out using multivariable logistic regression, including all variables associated with the outcomes at a level of statistical significance of $p<0.10$ in the univariable analyses. Lifetime rather than 12-month violence or violent victimization was preferred because of the relatively small numbers for the latter.

2.6 Ethical considerations

The proposal was approved by the Department of Psychiatry, School of Medicine, College of Health Sciences, Addis Ababa University. Data were collected only after the participants gave informed (verbal) consent.

3. RESULTS

3.1 Sample characteristics

A total of 401 people participated in the study, 201 with SMI and 200 without SMI. In the combined matched sample (n=400), 38.8% were female. The mean age was 40 years (SD 8.42) which, despite matching, was slightly higher in the SMI group (40.3 vs. 39.7 years, paired t-test 2.04; p=0.042).

[Table 1]

People with SMI were more likely than the comparison group to be unmarried and unemployed. See Table 1. All of the participants without SMI reported either occasional or frequent attendance at social activities, but in the SMI group 12.9% of persons with SMI reported never participating in social activities. Similarly, only people with SMI reported low levels of religious involvement (7.7%) whereas all of the people without SMI reported average or high involvement.

3.2 Perpetrated violence

Table 2 shows the different kinds of violence reported to have been committed by the study participants, comparing people with and without SMI. Most forms of violence were more commonly reported for people with SMI.

[Table 2]

The overall reported prevalence of perpetrated violence was higher in those with SMI than in the non-SMI comparison group: lifetime prevalence of 28.4% vs. 15.0% (X^2=14.88; p=0.001) and 12 month prevalence of 17.4% vs. 8.5% (X^2=7.36; p=0.009), in those with and without SMI, respectively. As shown in Table 3, SMI was associated with increased lifetime and 12 month prevalence of violence in univariate analyses. After adjusting for a range of potential confounders, the association between SMI and violence remained significant for lifetime violence but became marginally non-significant for violence in the preceding 12 months. Adjusting for alcohol and khat use had almost no impact on the size of association between SMI and violence or its significance. There was also no evidence of an interaction between SMI and khat in relation to violence (data not presented).

[Table 3]

3.3 Violent victimization

All forms of violent victimization were significantly higher in people with SMI compared to unaffected individuals. See Table 2. When all forms of actual violent victimization were combined together, the prevalence was higher in those with SMI (lifetime violent victimization 66.7% vs. 44.0%; McNemer X^2 (1)=2.85 p=0.092. and 12 month violent victimization 17.4% vs. 5.0%; McNemer X^2(1)=138.27 p < 0.0001). The odds of lifetime violent victimization in people with SMI remained significantly higher than in people without SMI after adjusting for a range of potential confounders in the multivariable

analysis (see Table 3). The association between SMI and violent victimization in the preceding 12 months became marginally non-significant in the multivariable analysis.

3.4 Factors associated with violence and violent victimization

3.4.2 Violence and victimization in people without SMI

As shown in Table 4, in people without SMI in the general population, male sex and being a victim of violence were associated independently with increased odds of lifetime violence. Being non-literate was associated with lower odds of lifetime violence in the univariate but not the multivariable analysis.

[Table 4]

In the univariate analysis, the odds of violent victimization were increased in those who were unmarried, literate and had a history of perpetrating violence. In the multivariable analysis, only being literate and a perpetrator of violence were associated significantly with violent victimization. Being unmarried became non-significant in the multivariable analysis although the magnitude of the odds ratio was similar to that in the univariate analysis and the confidence interval was very wide.

3.4.2 Violence and violent victimization in people with SMI

In people with SMI, a lifetime history of violence was associated with being unmarried, a victim of violence, unresponsiveness to treatment, male sex, being literate and having a

recent experience of a stressful event. After adjusting for potential confounding variables, all remained associated independently with lifetime violence, except unresponsiveness to treatment, although the lower 95% CI was 1.0 ($p = 0.050$) (Table 5).

[Table 5]

In univariate analyses, violent victimization in people with SMI was associated with unemployment, being a perpetrator of violence, being unresponsive to treatment, being non-adherent with medication, experiencing a stressful life event and being unmarried. In the multivariable analysis, violent victimization was only associated with unemployment, being a perpetrator of violence and non-adherence to medication.

4. DISCUSSION

In this study, the lifetime and 12-month prevalence of violence and violent victimization was elevated in people with SMI compared to a matched general population group of people without SMI in rural Ethiopia. Even though numerous studies have been conducted on the topic of violence and mental illness in high-income countries, these issues have not been well investigated in low-income country settings. The use of a population-based, clinician-confirmed, community sample of people with SMI and a matched comparison group are particular strengths of this study. Furthermore, the extent and types of violence and violent victimization were evaluated using standardized and culturally sensitive assessment tools.

4.1 Violence and SMI

The lifetime prevalence of violence in people with SMI in our community sample of people with chronic SMD (28.4%) is similar to the pooled prevalence of violence across the LMICs included in the aforementioned WHO study (31.5%) (Volavka et al., 1997). This prevalence estimate appears to be higher than most estimates of violence in community samples of people with SMI in high-income country settings (Fazel et al., 2009a), although methodological variations in measurement of violence limit comparisons across studies .

The higher prevalence of violence among people with SMI compared to the unaffected comparison group in our study is consistent with findings from high-income countries (Elbogen and Johnson, 2009; Fazel et al., 2009a; Fazel et al., 2009b; Fazel et al., 2010;

Short et al., 2013; Swanson et al., 1990; Swanson et al., 2006). However, in contrast to some of the high-income country studies (Elbogen and Johnson, 2009; Fazel et al., 2009a; Fazel et al., 2009b; Fazel et al., 2010; Swartz et al., 1998), SMI remained associated independently with lifetime violence after adjusting for a range of potential confounding factors. In this rural Ethiopian setting, the excess risk of violence among people with SMI does not appear to be explained by co-morbid substance misuse, although we were unable to investigate any effect of co-morbid personality disorder.

In people with SMI, the significant associations between lifetime violence and male sex, being single, a history of violent victimization and unresponsiveness to treatment (which can be taken to imply the presence of positive symptoms due to the low levels of recognition of negative symptoms in this setting (Shibre et al., 2010)) are in accordance with other cohort and community-based studies (Elbogen and Johnson, 2009; Silver et al., 2011; Sturup et al., 2011; Witt et al., 2013). In contrast to a recent meta-analysis of 110 studies examining risk factors for violence in people with SMI (Witt et al., 2013), lower socio-economic status, alcohol and drug (khat) use were not associated with violence in our study. The majority of participants were living below the absolute poverty line, with low variability across the sample, limiting our ability to examine the relationship between poverty and violence or victimization. Only 15.4% of persons with SMI reported using alcohol, which is much lower than reported in most high-income countries studies (Elbogen and Johnson, 2009; Swartz et al., 1998). Furthermore, the extent and severity of alcohol use, abuse or dependence was not evaluated in this study which may have limited our ability to detect an association between alcohol use and violence. Nearly two-thirds of study participants chewed khat but no association with violence was seen

in either people with SMI or the general population comparison group. Although small studies in humans have shown chronic khat use to be associated with impaired inhibitory control, there is little evidence to support the contention that this might translate into heightened interpersonal conflict or violent behavior. In the context of SMI, however, evidence from case reports and qualitative exploration indicates that khat use may exacerbate symptoms of psychosis and violent behavior (Alem and Shibre, 1997; Teferra et al., 2010). In the majority of people in rural Ethiopia, khat use occurs once or twice a week and within regulated social and religious contexts; more precise measures of abusive khat use may have found an association with violence.

The observed association between both violence and violent victimization and literacy was unexpected. One explanation could be measurement error; people with any education at all, ranging from a few years of primary school education up to college level were all classified as 'literate'. Another possible explanation is that behavioral expectations relevant to the manifestation of violence are more influenced by culture, religion and societal norms than by basic education. That said, although social inclusion (indicated by level of social activity) and religious commitment were thought, a priori, to be culturally important factors they were not associated with violence or violent victimization in the multivariable analyses.

4.2 Violent victimization

People with SMI were more victimized than the comparison group on all indicators. Furthermore, people with SMI were more likely to be victims of violence than perpetrators. These findings accord with several previous studies from high-income

countries (Choe et al., 2008; Hodgins et al., 2007; Silver et al., 2011). The burden of stigma, discrimination and disrespect experienced by people with SMI in rural Ethiopia has already been reported (Shibre et al., 2001). In this study, only people with SMI and none of the comparison group reported experiencing the humiliation of being mocked by children in their own community.

Unemployment, non-adherence to treatment and being a perpetrator of violence were associated with a history of violent victimization in people with SMI in our study. The association between violent victimization and history of violence is consistent with other studies from high-income countries (Choe et al., 2008; Hodgins et al., 2007; Maniglio, 2009; Silver et al., 2011; Swanson et al., 2006; Walsh et al., 2003); however, the cross-sectional nature of our study does not allow determination of the direction of causality or the potential mechanisms linking SMI to victimization. The exposure of people with SMI to goading by children raises the possibility that violence may be a response to provocation or threats from others in this setting. An alternative model proposed for high-income country settings emphasizes the social context in which people live: by virtue of drift into poverty, unemployment and the marginalization due to SMI, people with SMI may end up living in high-crime neighborhoods where they are both vulnerable to attack and socialized into violent behavior (Hiday et al., 2001). However, such a model does not seem to be applicable to rural low-income country settings. A third mechanism would be that violent behavior from a person with SMI provokes violence from others, for example, in self-defense. In the case series from Zambia, aggressive behavior related to uncontrolled symptoms in people with SMI appears to have preceded the violent attacks (Burdon, 1999). Non-adherence to medication was

associated with heightened risk of violent victimization in our study. Although people with SMI in our study did not have to pay for antipsychotic medication, the inaccessibility of centralized psychiatric services and influence of poverty meant that non-adherence was commonplace and likely to be associated with poorly controlled symptoms (Teferra et al., 2013). A fourth possible explanation relates to stigma. Aggression is considered to be the prototype of mental illness in this Ethiopian community and many low-income countries (Alem et al., 1999). This stigmatizing attitude may lead to a lower threshold for violence in response to deviant behavior in a person with SMI.

4.1 Limitations

First, due to the cross-sectional nature of the study, it was not possible to identify definitive risk factors for violence and violent victimization as reverse causality could not be excluded. Second, recall bias may have affected responses; however, by obtaining collateral information from family members this was minimized. Under-reporting of socially undesirable behaviors, such as violent acts, was also minimized through this approach. Third, since the data collectors were not clinicians, it was not possible to assess all of the factors in the HCR-20 (Webster et al., 1997). Clinical evaluation of psychopathy, early childhood maladjustment and the active symptoms of major mental illness would have been informative. Fourth, standard risk assessment methodology for measuring substance use and personality disorder was not used. The validity of the violence assessment instrument was not tested formally in this or similar communities, although this instrument was scrutinized carefully by the investigators, all of whom have

experience working as mental health professionals and researchers in this setting. Finally, the findings presented here might not be generalizable to patients with SMI in other settings. Attrition from the cohort from which this study sample was drawn may have led to selection bias, although the direction of bias is likely to have under-estimated the prevalence of violence. In other aspects our sample is typical of people with chronic SMD in rural settings in Ethiopia and relevant to other sub-Saharan African and low-income countries.

5. CONCLUSIONS

Qualitative exploratory and quantitative prospective studies are required to gain in-depth understanding of the relationship between violence and victimization in persons with SMI. Nonetheless, our finding of high levels of violence and violent victimization in persons with SMI in this setting underscores the need to improve access to mental health care, as well as raise awareness and intervene to reduce victimization in people with SMI.

Table 1: Characteristics of people with severe mental illness (SMI) compared to a general population sample matched for age and sex.

	N (%)	***Population comparison group (n=200) N (%)***	***Persons with SMI (n=200) N (%)***	***Odds ratio for general population compared to people with SMI (95% confidence interval)***
Non-literate	124 (30.9)	66 (33.0)	58 (28.9)	1.33 (0.76, 2.36)
Unemployed	45 (11.2)	9 (4.5)	36 (17.9)	0.18 (0.60, 0.44)
Monthly income < 500 Birr(~$29)	333 (87.0)	157 (80.9)	176 (93.1)	0.18 (0.06, 0.49)
Unmarried (single, separated, divorced, widowed)	109 (27.2)	32 (16.0)	77 (38.5)	0.25 (0.13, 0.45)
Religious commitment				
High	24 (6.0)	12 (6.0)	12 (6.0)	0.00 (0.00, 0.13)
Average	346 (86.3)	188 (94.0)	158 (78.6)	
Low	31 (7.7)	0 (0)	31 (15.4)	
Social activity				
Attends most	293 (73.1)	188 (94.0)	105 (52.2)	0.00 (0.00, 0.15)
Occasional	82 (20.5)	12(6.0)	70 (34.8)	
Never	26 (6.5)	0 (0)	26 (12.9)	
Drinks alcohol	64 (16.0)	33 (16.6)	31 (15.4)	1.10 (0.57, 1.17)
Chews khat	249 (62.3)	126 (63.3)	123 (61.2)	1.13 (0.62, 2.04)
Psychiatric diagnosis				
Schizophrenia	-	92 (45.8)	-	-
Bipolar disorder	-	109 (54.2)		
Unresponsive to treatment	-	43 (21.4)	-	-
Non-adherent to treatment	-	119 (59.2)	-	-

Stressful life event	-	108 (53.7)	-	-

Table 2: Lifetime and 12 month prevalence of reported violence by and against persons with severe mental illness (SMI) compared to a general population sample matched for age and sex.

Violent acts and experiences	***Time period***	***N (%)***	***Population comparison group (n=200) N (%)***	***Persons with SMI (n=200) N (%)***	***Odds ratio (OR) for general population compared to people with SMI***
Actual violence against others					
Used a weapon	12 months	23 (5.7%)	9 (4.5%)	14 (7.0%)	0.58 (0.19, 1.61)
	Lifetime	92 (22.9%)	30 (15.0%)	62 (30.9%)	0.26 (0.12, 0.50)
Hit someone hard	12 months	15 (3.7%)	4 (2.0%)	11 (5.5%)	0.30 (0.05, 1.16)
	Lifetime	72 (18.0%)	19 (9.5%)	53 (26.4%)	0.25 (0.00, 2.53)
Purposely set a fire	12 months	0 (0.0%)	0 (0.0%)	0 (0.0%)	-
	Lifetime	7 (1.8%)	2 (1.0%)	5 (2.5%)	0.25 (0.01, 2.53)
Forced sexual	12 months	2 (0.5%)	0 (0.0%)	2 (1.0%)	0.00 (0.00, 5.32)
intercourse	Lifetime	10 (2.5%)	2 (1.0%)	8 (4.0%)	0.14 (0.00, 1.11)
Fought when	12 months	5 (1.3%)	1 (0.5%)	4 (2.0%)	0.25 (0.01, 2.53)
drinking alcohol	Lifetime	13 (3.2%)	5 (2.5%)	8 (4.0%)	0.63 (0.16, 2.17)
Fought while	12 months	6 (1.5%)	1 (0.5%)	5 (2.5%)	0.20 (0.00, 1.79)
chewing khat	Lifetime	18 (4.5%)	3 (1.5%)	15 (7.5%)	0.08 (0.00, 0.51)
Purposely hurt	12 months	12 (3.0%)	4 (2.0%)	8 (4.0%)	0.43 (0.07, 1.88)
someone	Lifetime	32 (8.0%)	9 (4.5%)	23 (11.4%)	0.33 (0.12, 0.81)
Involved in fight	12 months	26 (6.5%)	8 (4.0%)	18 (9.0%)	0.41 (0.14, 1.04)
which came to blows	Lifetime	61 (15.2%)	16 (8.0%)	45 (22.4%)	0.22 (0.09, 0.47)
Started a fight	12 months	13 (3.2%)	2 (1.0%)	11 (5.5%)	0.10 (0.00, 0.70)
	Lifetime	25 (6.2%)	4 (2.0%)	21 (10.5%)	0.15 (0.03, 0.51)
Threatened violence or violence against property					
Frightened someone	12 months	14 (3.5%)	4 (2.0%)	10 (5.0%)	0.25 (0.03, 1.25)
	Lifetime	31 (7.7%)	8 (4.0%)	23 (11.4%)	0.29 (0.09, 0.73)
Damaged property	12 months	5 (1.3%)	2 (1.0%)	3 (1.5%)	0.67 (0.06, 5.82)
	Lifetime	17 (4.2%)	2 (1.0%)	15 (7.5%)	0.13 (0.01, 0.57)
Victim of violence					

Been slapped or something thrown at them	12 months	34 (8.5)	6 (3.0%)	28 (13.9%)	0.12 (0.02, 0.39)
	Lifetime	205 (51.1)	83 (41.5%)	122 (60.7%)	0.13 (0.06, 0.25)
Been hit with a fist	12 months	30 (7.5)	6 (3.0%)	24 (11.9%)	0.14 (0.03, 0.48)
	Lifetime	149 (37.2)	55 (27.5%)	94 (46.8%)	0.25 (0.12, 0.47)
Been, kicked, dragged, chained or beaten	12 months	29 (7.2)	5 (2.5%)	24 (11.9%)	0.09 (0.01, 0.39)
	Lifetime	149 (37.2)	44 (22.0%)	105 (52.2%)	0.10 (0.04, 0.22)
Been threatened or attacked with a weapon	12 months	25 (6.2)	5 (2.5%)	20 (10.0%)	0.17 (0.03, 0.57)
	Lifetime	98 (24.4)	20 (10.0%)	78 (38.8%)	0.08 (0.02, 0.19)
Been mocked by children	12 months	10 (2.5)	0 (0%)	10 (5.0%)	0.00 (0.00, 0.45)
	Lifetime	26 (6.5)	0 (0%)	26 (12.9%)	0.00 (0.00, 0.15)
Forced to have sexual intercourse	12 months	6 (1.5)	1 (0.5%)	5 (2.5%)	0.20 (0.00, 1.79)
	Lifetime	16 (4.0)	2 (1.0%)	14 (7.0%)	0.14 (0.02, 0.62)

Table 3: Adjusted effects of having SMI on the odds of being the perpetrator or victim of violence

	Odds ratio (OR) for people with severe mental illness compared to general population (n=400)	
	Crude OR	**Adjusted OR**
Perpetrator of violence within last 12 months	2.28 (1.23, 4.23)	1.92 (0.95, 3.89)
Perpetrator of violence within lifetime	2.26 (1.38, 3.71)	1.89 (1.05, 3.40)
Victim of violence within last 12 months	4.03 (1.94, 8.39)	2.20 (0.95, 5.09)
Victim of violence within lifetime	2.58 (1.72, 3.88)	1.91 (1.21, 3.01)

Adjusted for age, sex, marital status, literacy, employment status, monthly income, social involvement, religious commitment, alcohol and khat use

Table 4: Multivariable model of factors associated with lifetime violence and victimization in people without SMI (n=200)

	Lifetime violence		***Lifetime violent victimization***	
	Crude Odds Ratio (OR) (n=200)	**Adjusted OR (n=200)**	**Crude OR**	**Adjusted OR**
Increasing age (years)	0.99 (0.94, 1.04)	0.99 (0.94, 1.05)	0.99 (0.95, 1.02)	0.99 (0.94, 1.05)
Female sex	0.04 (0.01, 0.32)	0.05 (0.01, 0.39)	0.93 (0.52, 1.65)	1.95 (0.93, 4.08)
Non-literate	0.12 (0.03, 0.51)	0.42 (0.84, 2.09)	0.38 (0.20, 0.72)	0.35 (0.16, 0.76)
Not married	1.38 (0.52, 3.72)	-	2.45 (1.12, 5.34)	2.11 (0.92, 13.66)
Unemployed	1.66 (0.33, 8.42)	-	1.02 (0.27, 3.91)	-
Monthly income < 500 Birr($29)	0.56 (0.23, 1.39)	-	0.62 (0.30, 1.27)	-
Current alcohol use	1.31 (0.49, 3.52)	-	1.06 (0.50, 2.25)	-
Current khat use	1.00 (0.45, 2.24)	-	1.12 (0.63. 2.00)	-
Lifetime violence	-	-	5.31 (2.16, 13.07)	5.25 (2.02, 13.66)
Lifetime victimization	5.31 (2.16, 13.07)	5.43 (2.09, 14.12)	-	-

Table 5: Factors associated with lifetime violence and violent victimization in persons with severe mental illness (n=201)

	Lifetime violence		***Lifetime violent victimization***	
	Crude Odds Ratio (OR)	***Adjusted OR***	***Crude OR***	***Adjusted OR***
Age (years)	1.00 (0.96, 1.03)	1.00 (0.95, 1.05)	1.00 (0.97, 1.04)	1.02 (0.98, 1.06)
Female sex	0.46 (0.23, 0.90)	0.23 (0.08, 0.68)	1.10 (0.60, 2.01)	1.94 (0.83, 4.52)
Non-literate	0.29 (0.08, 0.52)	0.24 (0.08, 0.71)	0.68 (0.36, 1.28)	-
Unemployed	1.81 (0.85, 3.84)	0.45 (0.12, 1.68)	4.94 (1.67, 14.63)	4.01 (1.04, 15.49)
Monthly income < 500 Birr($29)	0.94 (0.28, 3.20)	-	1.70 (0.55, 5.29)	-
Not married	3.13 (1.66, 5.89)	3.93 (1.46, 10.61)	2.38 (1.25, 4.55)	
Low vs. average or high religious commitment	2.07 (0.94, 4.56)	0.90 (0.27, 2.96)		
Low social attendance (never vs. occasional or always)	1.70 (0.72, 4.01)	-	1.42 (0.56, 3.56)	-
Current alcohol use	0.86 (0.36, 2.05)	-	1.27 (0,55, 2.93)	-
Current khat use	1.55 (0.81, 2.96)	1.19 (0.48, 2.94)	0.75 (0.41, 1.38)	-
Victim of violence (actual)	22.63 (5.32, 96.3)	19.12 (4.06, 90.0)		
Perpetrator of violence		-	22.63 (5.32, 96.32)	25.31 (5.36, 119.5)
Bipolar vs. schizophrenia	1.47 (0.79, 2.72)	-	1.16 (0.64, 2.10)	-
Unresponsive to treatment	4.78 (2.34, 9.77)	2.66 (1.00, 7.04)	4.91 (1.83, 13.15)	2.57 (0.83, 8.00)
Non-adherent to treatment	0.76 (0.41, 1.41)	-	1.85 (1.02, 3.35)	2.91 (1.31, 6.45)
Stressful life event	3.31 (1.69, 6.50)	3.35 (1.30, 8.64)	2.49 (1.36, 4.54)	1.37 (0.65, 2.91)

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